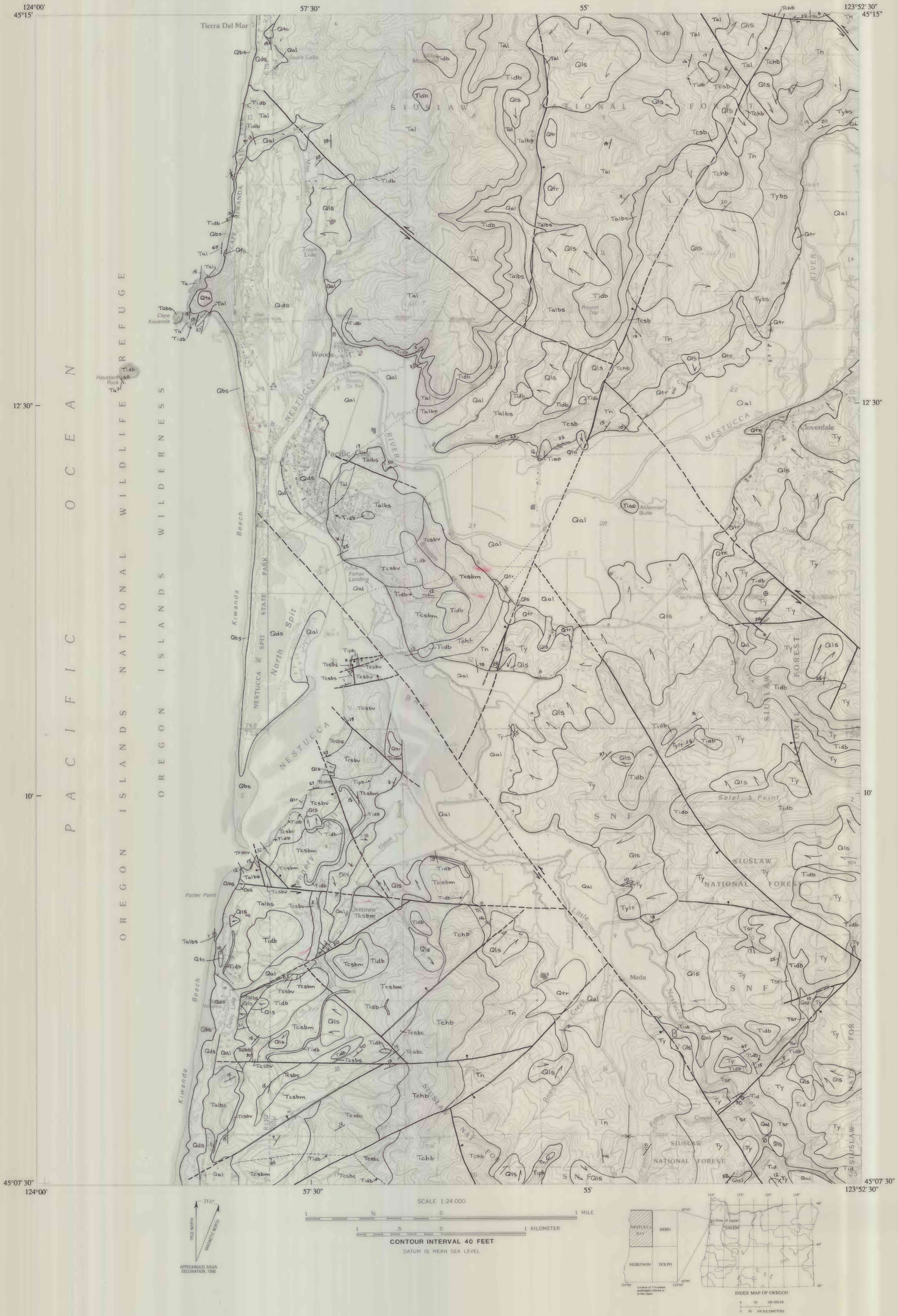
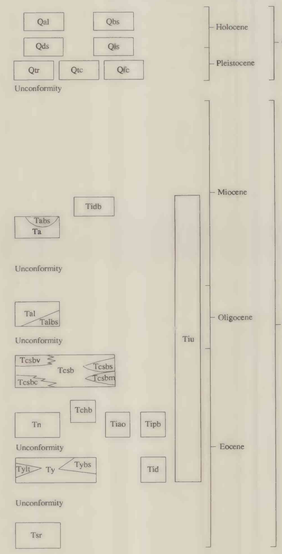


CORRELATION OF MAP UNITS



DESCRIPTION OF MAP UNITS

SURFICIAL DEPOSITS

Qal **Alluvial deposits (Holocene)**—Silt, sand, and gravel along rivers and streams; locally includes low-lying river terrace gravels and thick colluvium; also includes estuarine and lagoonal mud, silt, and sand marginal to Nestucca Bay; in places unmapped Tertiary bedrock is exposed in river beds

Qbs **Beach and spit sands (Holocene)**—Beach sand and minor gravel, and spit sands; Tertiary bedrock is locally exposed at low tide along beach in winter and spring

Qds **Dune sands (Holocene and Pleistocene)**—Active and stabilized dunes on the Nestucca River spit, adjacent to Kiwanda Beach north of Neskowin, and in the Pacific City-Cape Kiwanda area; thin veneer of colian sand on bedrock in coastal area not mapped

Qls **Landslide debris (Holocene and Pleistocene)**—Mapped where deposits are readily apparent or inferred from topographic expression on maps or aerial photographs; thin colluvial deposits and small soil or rock failures not shown; landslides are pervasive, but of greatest areal extent marginal to areas capped by basalt sills and areas underlain by siltstone along the lower reaches of the Nestucca River; half arrows show direction of movement

Qtr **River terrace deposits (Pleistocene)**—Sand and gravel; includes uplifted river deposits and estuarine deposits of carbonaceous sand and silt adjacent to Nestucca Bay; modified in places by landslide or colluvial deposits

Qtc **Coastal terrace deposits (Pleistocene)**—Thick- to thin-bedded planar to cross-bedded fine- to medium-grained nonmarine sand with minor interbeds of carbonaceous silt; well rounded basalt cobble and pebble gravel and fossil wood deposited locally at contact with Tertiary bedrock

Qfc **Filled channel deposits (Pleistocene)**—Semi-consolidated medium-bedded cross-stratified poorly sorted coarse-grained sand with interbeds of gravel, massive carbonaceous silt and clay with large fragments of carbonized wood; unit contains 1 to 1.5 m bed of blocky weathering peat and lignite with thin sand and silt interbeds; peat bed is overlain by light-gray blocky-weathering tuffaceous(?) clay; unit exposed in sea cliff 350 m north of Cape Kiwanda is approximately 10 m thick, but a water well drilled near the village of Woods, 4 km southeast of the sea cliff outcrop, penetrated 55 m of correlative channel fill deposits (Snavely, 1948)

BEDROCK UNITS

Ta **Astoria Formation (middle Miocene)**—Massive to cross-bedded and medium- to thin-bedded fine- to medium-grained micaceous, carbonaceous, arkosic to lithic sandstone and thin-bedded sandy carbonaceous siltstone; sandstone beds exhibit planar and trough cross-bedding and local large scale convolute bedding and slump structures occur locally near the unconformable contact with underlying Alsea Formation; Astoria strata are highly bioturbated and contain abundant trace fossils and thin beds of siltstone conglomerate; on north side of Cape Kiwanda glauconie, fish vertebrae, and sharks teeth are concentrated along unconformable contact with the Alsea Formation and sandstone-filled burrows of Astoria sandstone extend 10 to 15 cm into Alsea mudstone; in places contain concretions and concretionary ledges, poorly preserved mollusks, and a few lenses of pebble to boulder conglomerate composed chiefly of basalt clasts; iron-oxide-stained calcareous concretions, iron sulfide nodules, and carbonized wood fragments are common; unit crops out only at Cape Kiwanda where it is intruded by a 1.5 m basalt dike of middle Miocene Depoe Bay Basalt (Tidb) petrographic type (Snavely and others, 1973); mollusks indicate a correlation with the middle Miocene Astoria Formation at Newport, Oregon (Snavely and Vokes, 1949); foraminifers from the Astoria Formation at Newport are assigned to the middle Miocene Saucesian Stage (Snavely and others, 1976)

Tabs **Basaltic sandstone member of the Astoria Formation**—Filled-channel deposits of massive and trough cross-bedded medium-grained concretionary sandstone that contains slump structures and thin irregular siltstone beds; irregular basal contact of channel has up to 4 m of relief; sandstone composed of grains of piltoxitic basalt derived from upper Eocene volcanic units together with quartz and plagioclase set in a calcite cement; unit crops out only on westernmost part of the southern headland at Cape Kiwanda

Tal **Alsea Formation (Oligocene)**—Massive to thin-bedded, blocky- and concoidal-weathering tuffaceous siltstone and claystone with interbeds of arkosic and basaltic fine-grained sandstone; thin tuff beds, calcareous concretions, and ledges of calcareous sandstone occur locally; minor amounts of carbonaceous material present in sandy siltstone; sparse foraminifers assigned to the Refugian and Zemorrian Stages by W.W. Rau (written commun., 1983); abundant redeposited diatoms assigned a middle Eocene to early Oligocene age by John Barron (written commun., 1989)

Talbs **Basaltic sandstone member of the Alsea Formation**—Massive to thick-bedded and trough cross-bedded basaltic grit to fine-grained concretionary sandstone with minor pebble conglomerate and siltstone; unit consists in part of broad overlapping packets of trough cross-bedded sandstone with thin-bedded carbonaceous siltstone partings; iron oxide-stained marcasite concretions occur locally; hackly-weathering sandstone contains brick-red scoria clasts and small scour and fill channels rich in shell debris; near the planar unconformable contact with the underlying sedimentary member of the Cannery Hill sequence (unit Tcsbv) along the south side of Nestucca Bay, unit Talbs consists of medium-bedded fine- to very-fine-grained fossiliferous basaltic sandstone with discontinuous calcareous ledges up to 0.3 m thick separated by tuffaceous siltstone partings; the base of the unit is marked by a 0.5 m calcareous ledge with abundant large pectens and other mollusks; this basal ledge overlaps the underlying Cannery Hill unit Tcsbs and rests upon basalt flows and breccia of unit Tcsbv; foraminifers assigned to the Refugian Stage by W.W. Rau (written commun., 1964); coccoliths assigned to the lower Oligocene CP16c(?) Subzone by D. Bukry (personal commun., 1989)

Tcsb **Sedimentary rocks and basalt of Cannery Hill (upper Eocene)**—A sequence that includes four units from youngest to oldest, (1) thin-bedded siltstone with lithic sandstone interbeds, (2) basalt flows and breccia, (3) massive tuffaceous mudstone, (4) basalt conglomerate and sandstone

Tcsbs **Siltstone and sandstone**—Thin-bedded carbonaceous tuffaceous siltstone and silty fine-grained sandstone with 2-3 cm tuff beds, and 0.3 m beds of flaggy dark-gray siltstone with thin-shelled mollusks; contains ledge-forming irregular and cross-bedded calcareous basaltic sandstone, light-gray tuffaceous sandstone, and a 1-m laminated dark-gray fine-grained basaltic sandstone and light-gray laminae rich in foraminifers and shell fragments; contains channelized massive to thick-bedded pebbly and gritty basaltic sandstone with mollusk-rich beds including large pectens, and calcareous concretions and marcasite nodules; foraminifers assigned to the lower part of the Refugian Stage by W.W. Rau (written commun., 1983); coccolith flora assigned to the late Eocene Subzone CP15a by D. Bukry (written commun., 1989)

Tcsbv **Basalt**—Platy basalt flows, pillow lavas, lapilli tuff, and mudflow breccia with blocks of dense basalt up to 0.5 m; in places basalt is vesicular and scoriaceous; cut by feeder dikes and a small plug-like body; red oxidized scoriaceous basalt breccia with rare volcanic bombs probably represent subaerial near vent eruptions; contains channel-fill deposits of basaltic sandstone and boulder and cobble conglomerate; the chemistry of these basalts differ from the underlying Basalt of Cascade Head, notably by their higher TiO_2 content

Tcsbm **Mudstone and siltstone**—Massive, blocky-weathering siliceous mudstone and siltstone with channel-fill deposits of basaltic sandstone and minor beds of fine-grained sandstone and tuff; contains numerous light-gray siliceous concretions up to 1.5 m in diameter; sparse diatoms, the only microfossils found in siltstone, suggest a latest Eocene or early Oligocene (J. Barron, written commun., 1988)

Tcsbc **Conglomerate and sandstone**—Cobble and boulder basalt conglomerate overlain by massive to thick-bedded and cross-bedded fossiliferous coarse- to medium-grained basaltic sandstone; contains grains of red scoria and a 2-5 cm zone of shell hash; these basaltic sedimentary rocks were eroded off underlying upper Eocene Basalt of Cascade Head

Tchb **Basalt of Cascade Head (upper Eocene)**—Subaerial flows of massive to platy, spheroidal-weathering porphyritic olivine-augite basalt, plagioclase-phyric basalt, aphanitic basalt, and alkalic basalt commonly with red scoriaceous upper surfaces; fine to lapilli subaqueous-tuff and flow breccia are interbedded in the flow sequence; includes numerous feeder dikes of basalt, porphyritic basalt and plagioclase-rich basalt (not differentiated on map); locally basalt is very vesicular, rarely pillowed, and commonly veined with calcite; siltstone clasts and calcareous concretions derived from underlying Nestucca Formation are commonly associated with breccias in lower part of sequence; the basalt of Cascade Head thins northward and grades laterally into marine tuffaceous siltstone and sandstone with subaqueous lapilli tuff interbeds assigned to the Nestucca Formation (Tn); the Basalt of Cascade Head correlates with the upper Eocene Yachats Basalt of Snavely and MacLeod (1974)

Tn **Nestucca Formation (upper Eocene)**—Medium to thin-bedded tuffaceous siltstone with interbeds of fine-grained arkosic and basaltic sandstone up to 0.5 m thick; contains 0.2 to 0.8 cm-thick tuff beds and calcareous concretions; in places sandstone is irregularly bedded, glauconitic, and fossiliferous; locally the siltstone beds are bioturbated and fissile; north of the Nestucca River contains interbeds of lapilli tuff, mudflow breccia, and basaltic sandstone; foraminifers are assigned to the upper Eocene Narizian Stage by W.W. Rau (written commun., 1979); coccoliths in the Nestucca Formation that crop out to the south in the Neskowin quadrangle are assigned to the late Eocene CP15a Subzone (Bukry and Snavely, 1988)

Ty **Yamhill Formation (middle Eocene)**—Massive to thin-bedded concretionary finely micaceous siltstone with minor interbeds of thin- to medium-bedded micaceous arkosic and lithic sandstone; contains thick- to medium-bedded basaltic sandstone with thin siltstone interbeds and siltstone rip-ups; basaltic sandstone is flaggy and contains red scoria fragments and shell hash; tuff beds up to 1/2 m thick occur locally; in adjacent Hebo and Neskowin quadrangles foraminiferal assemblages assigned to the upper Ulatisian Stage and to the lower to middle part of the Narizian Stage by W.W. Rau (written commun., 1986); coccolith flora assigned to the middle Eocene Subzones CP13c and CP14a (Bukry and Snavely, 1988); a zeolitized diabase sill 50 m thick intrudes the Yamhill Formation on Three Rivers in the Hebo quadrangle, and has a K/Ar age of 43.2 ± 1.8 Ma (LedaBeth Pickthorn, written commun., 1987); north of the map area the Yamhill Formation intertongues with tuff-breccia, basaltic sandstone and siltstone, and basalt flows of the Tillamook Volcanics; a regional unconformity is present at the base of the Yamhill Formation and it onlaps rocks as old as lower Eocene

Tylt **Breccia member**—Tuff breccia interbeds with 1/2-m beds of siltstone; breccia contains clasts of olivine-augite-phyric basalt; breccia is iron-stained and zeolitized; although unit is discontinuous along strike, it may represent a tongue of breccia extending south from the middle part of the Eocene Tillamook Volcanics that crop out north of the quadrangle

Tybs **Sandstone and tuff member**—Thick- to medium-bedded dark-gray basaltic sandstone and lapilli tuff with interbeds of well indurated dark-gray platy and nodular basaltic siltstone; analcime forms cement in some beds; concretions locally abundant; lapilli and tuff breccia contain augite crystal fragments and are zeolitized; upper part of unit contains interbeds of arkosic and lithic sandstone; tuff breccia and basaltic strata represent material derived from the middle Eocene Tillamook Volcanics that crop out to the north; siltstone contains foraminifers assigned to late middle or early late Eocene by W.W. Rau (written commun., 1964); coccoliths are assigned to middle Eocene Subzone CP14a by D. Bukry (written commun.,1988)

Tsr **Siletz River Volcanics (lower Eocene)**—Pillow lava, flow-breccia, tuff-breccia, and lapilli-tuff of tholeiitic basalt with minor thin interbeds of marine basaltic siltstone, sandstone, and conglomerate; close-packed pillows range in diameter from 1/3 to 2 m (averaging 1 m), have radiating columnar joints, are pervasively zeolitized, veined with calcite, and commonly amygdaloidal; basalt is aphanitic to porphyritic with phenocrysts of plagioclase and augite; on Fall Creek, minor basalt conglomerate, sandstone, and mudflow deposits are included in Siletz River Volcanics; coccolith flora from siltstone interbed in pillow lavas on Little Nestucca River are assigned to Zone CP1O of early Eocene age (Bukry and Snavely, 1988); pillow lavas and breccia are considered to be ocean ridge basalts and oceanic islands formed during the rifting of the continental margin (Snavely and others, 1968; Snavely, 1987)

INTRUSIVE ROCKS

Tidb **Depoe Bay Basalt (middle Miocene)**—Sills, inclined sheets, dikes, and irregular-shaped intrusive bodies of massive and platy columnar jointed fine-grained equigranular basalt; in the adjacent Mt. Hebo quadrangle extensive sills cap Mt. Hebo and Mt. Cauldy; basalt intrudes rocks as old as the early Eocene Siletz River Volcanics and as young as the middle Miocene Astoria Formation; a K/Ar age of 15.9 ± 0.5 was obtained from the basalt sill on Fall Creek in the southeastern corner of the Nestucca Bay quadrangle (LedaBeth Pickthorn, written commun., 1983); petrochemically similar to the Grande Ronde Basalt of the Columbia River Basalt Group (Snavely and others, 1973)

Tiao **Porphyritic olivine, augite, plagioclase basalt (upper Eocene)**—Small stock, sill, and volcanic neck at Alderman Butte that intrude the Nestucca Formation; volcanic neck is columnar-jointed along its margin and is composed of 12 percent titaniferous augite phenocrysts up to 1 cm in length; 6 percent olivine and 7 percent plagioclase (An 78) phenocrysts; rocks with similar compositions and age occur as flows in the Basalt of Cascade Head (unit Tchb) and as thick, widespread sills that crop out to the south in the Neskowin and Dolph quadrangles

Tipb **Porphyritic basalt and basaltic andesite dikes (upper Eocene)**—Plagioclase phenocryst-bearing basalt dikes 1/2 to 3 m in width and less common small stocks; dikes probably erupted to form flows and breccia in Cannery Hill basalt (Tcsbv)

Tid **Diabase (middle Eocene)**—Sills of fine- to coarse-grained equigranular to porphyritic diabase; commonly albitized and laumontized; lower sill contains large columnar joints up to 1 m in width; basalt at chilled margins has pilotaxitic texture and in places is vesicular or amygdaloidal; lower sill exposed in Little Nestucca River is about 100 m thick and is overlain by a sill about 60 m thick; a sill correlative with the lower coarse-grained sill in the adjacent Mt. Hebo quadrangle has a K/Ar plagioclase age of 43.2 ± 1.8 Ma (LedaBeth Pickthorn, written commun., 1987)

Tiu **Basaltic intrusive rocks, undivided (middle Miocene and Eocene)**—Sills and dikes of basalt, diabase, and fine-grained gabbro

ACKNOWLEDGMENTS

The authors gratefully acknowledge age assignments based upon foraminifers by W.W. Rau and upon coccoliths by D. Bukry. Their biostratigraphic studies improved the quality of both the stratigraphic and tectonic framework of the area. Rau's assignments of the foraminiferal assemblages are to the Eocene Stages of Mallory (1959), Eocene and Oligocene Stages of Schenck and Kleinpell (1936), and the Oligocene and Miocene Stages of Kleinpell (1938). The authors also thank Daniel Hafley, Alan Niem, and Erik Villas who assisted in geologic field studies. Holly C. Wagner's careful review of the map and explanation is gratefully acknowledged.

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EXPLANATION OF MAP SYMBOLS

Geologic contact - Approximately located or inferred; dotted where concealed. Contacts exposed only in few places along riverbeds, sea cliffs, or major logging roads; elsewhere contacts are based on topographic expression of rock units

Fault - Approximately located or inferred; showing dip where known. Dashed where concealed, ball and bar on apparent downthrown side. Faults located on basis of shear zones, juxtaposition of strata with differing attitudes, anomalous steep attitudes, and (or) topographic lineations

Fault - Showing relative horizontal movement.

Folds - Showing inferred trace of axial plane and direction of plunge where known. Dotted where concealed.

Anticline

Syncline

Strike and dip of beds

Inclined

Horizontal

Tectonic or Igneous Features

Sheared sedimentary rocks

Dike or sill of basalt or diabase generally 1-3 m thick; letter symbol indicates rock type listed in description of igneous map units; number indicates dip

PRELIMINARY GEOLOGIC MAP OF THE NESTUCCA BAY QUADRANGLE, TILLAMOOK COUNTY, OREGON

By,

Parke D. Snavely, Jr., Norman S. MacLeod, and Diane L. Minasian

1990